

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A remote copy control method for remotely copying a plurality of volumes ~~formed~~ located in a plurality of disk subsystems, wherein a host computer is connected to at least one of the plurality of disk subsystems, the remote copy control method comprising the steps of:

obtaining an identifier of a first disk subsystem of a first volume from a volume pair list for the host computer connected to at least one of the disk subsystems,
wherein the first volume being is a copy source or a copy destination of a volume pair,

wherein the volume pair is as a remote copy target in the disk subsystems,
and for a host computer connected to at least one of the disk subsystems, based on
a

wherein the volume pair list for registering registers an identifier of the first volume and an identifier of the first disk subsystem of the first volume;

searching a route list for route information including the identifier of the first disk subsystem ~~based on a~~,

wherein the route list including the route information for registering registers
an identifier of a plurality of second disk subsystems for ~~relay as~~ relaying a command

transmitting route for the first disk subsystem and information for determining an identifier of a third disk subsystem connected to the host computer from among the second disk ~~subsystems; subsystems, and~~ _____ obtaining an identifier of the third disk subsystem ~~expressed~~ found in by the searched route information; and

issuing, to the third disk subsystem corresponding to the obtained identifier, a remote copy command of the first volume including, in ~~an~~ input information, the identifier of the second disk subsystem and the identifier of the first disk subsystem.

2. (currently amended) The remote copy control method according to Claim 1, further comprising the steps of:

receiving error information on the remote copy command from the third disk subsystem;

searching the route list and obtaining identifiers of a plurality of fourth disk subsystems for ~~relay as~~ relaying the command transmitting route and an identifier of a fifth disk subsystem connected to the host computer from among the fourth disk subsystems,

wherein the identifiers of the plurality of fourth disk subsystems for ~~relay~~ relaying and the identifier of the fifth subsystem ~~being expressed~~ are found in route information different from the route information having the received error information; and

issuing, to the fifth disk subsystem, the remote copy command of the first volume including, in the input information, the identifier of the fourth disk subsystem and the identifier of the first disk subsystem.

3. (original) The remote copy control method according to Claim 2, further comprising the steps of:
 setting priority to the route information in the route list; and
 degrading the priority set to the route information when the error information is received.

4. (original) The remote copy control method according to Claim 1, further comprising the steps of:
 obtaining a host identifier for uniquely identifying the host computer;
 adding the host identifier to the route information; and
 deleting, from the route list, the route information having the host identifier of the host computer that does not match the host identifier added to the route information.

5. (currently amended) The remote copy control method according to Claim 1, further comprising the steps of:

~~inquiring the~~ determining a main/sub property of the first volume ~~to of~~ the first disk subsystem;

obtaining a second volume as a pair of the first volume ~~based on~~ from the volume pair list, when the main/sub property of the first volume does not match the main/sub property required by a host command; and

issuing the remote copy command to the disk subsystem of the second volume.

6. (currently amended) A command path control method of a disk controller, wherein a command is transmitted for volumes located in a plurality of disk controllers, the method comprising the steps of:

~~in the case of transmitting a command for volumes formed to a plurality of disk controllers,~~

extracting identifiers of the ~~different~~ plurality of disk controllers from a volume pair list,

~~wherein the volume pair list registers for registering~~ an identifier of a first volume as a copy source or a copy destination in a volume pair and registers an identifier of a first disk controller including the first volume.

~~wherein the volume pair is of a remote copy target in the disk controllers and an identifier of a first disk controller including the first volume,~~

wherein the identifier of the first volume and the identifier of the first disk controller ~~being~~ are identified from an identifier of a host command for at least one host computer connected to at least one of the plurality of disk controllers;

obtaining a second disk controller for directly receiving a command from the host computer ~~from among the extracted identifiers of the~~ the plurality of different disk controllers corresponding to the extracted identifiers;

generating a disk controller path list comprising a set of the identifiers of a pair of disk controllers,

wherein the set of the identifiers of a pair of disk controllers includes a disk controller pair having at least one of a first identifier and a second identifier of the disk controllers, and

wherein the disk controller pair ~~which is different from those of another pair,~~ serving as a volume pair included in the volume pair list;

obtaining a set of identifiers including ~~the third~~ an identifier of a third disk controller from the disk controller path list; and

generating a route list including route information including the identifier of the host computer, the identifier of the third disk controller, and ~~the~~ an identifier of a fourth disk controller, wherein the identifier of the fourth disk controller is different from the identifier of the third disk controller in the set including the identifier of the third disk controller.

7. (currently amended) The command path control method according to Claim 6, further comprising the steps of:

obtaining information for identifying whether or not a remote copy command is received from a third disk controller different from the second disk controller included

in the set including the disk controllers, ~~via the disk controller different from the third disk controllers~~; and

adding, to ~~a the~~ route list, route information including the identifier of the third disk controller only when reception is possible.

8. (currently amended) The command path control method according to Claim 6, further comprising the steps of:

extracting ~~an the~~ identifier of ~~a the~~ fourth disk controller in all ~~the~~ designated volume pair lists, ~~from lists from~~ a first host computer;

transmitting a list including of the identifier of the fourth disk controller to all of a plurality of second host computers including the first host computer;

issuing a remote copy command to all of ~~the~~ a plurality of fourth disk controllers and transmitting, to one of the plurality of second host computer~~computer~~, the identifier of the ~~successful~~ second disk controller receiving the remote copy command and an identifier of the second host computer which issues the remote copy command; and

generating a host path list including the transmitted identifier of the second disk controller and the identifier of the second host computer.

9. (currently amended) The command path control method according to Claim 6, further comprising the steps of:

obtaining ~~all~~ identifiers of a plurality of fourth disk controllers for directly issuing a command from the host ~~computer~~ computers in a host path list, wherein the host path list includes ~~including one and/or a plurality of~~ or more sets including ~~of~~ a host identifier for uniquely identifying the host computers and the identifier of the fourth disk controller;

obtaining first logical path information ~~on~~ for the fourth disk controller;

extracting an identifier of a fifth disk controller ~~in~~ from the first logical path information;

generating route information including the identifier of the fourth disk controller and the identifier of the fifth disk controller;

obtaining second logical path information ~~on~~ for the fifth disk controller;

extracting the identifier of the first disk controller included in the second logical path information; and

adding, to the route information, the identifier of the first disk controller.

10. (currently amended) The remote copy control method according to Claim 1, further comprising the steps of:

generating a volume pair list which ~~copies all of~~ includes the identifier of the first volume as the copy destination of the volume pair in ~~the~~ a designated volume pair list and the identifier of the disk subsystem ~~subsystems~~ to which the first volume belongs; and

fetching an identifier of a second volume as a pair of the first volume and an identifier of a sixth disk subsystem to which the second volume belongs.

11. (currently amended) The remote copy control method according to Claim 1, further comprising the steps of:

extracting from the volume pair list all the volume pairs having at least one different identifier of adapters ~~to which the first volume belongs,~~
wherein from the volume pair list for registering registers the identifier of the first volume as the copy source or copy destination ~~of the remote copy target volume pair in the disk subsystem and~~ further registers the identifier of the an adapter,
wherein the volume pair is a remote copy target in the disk subsystem, and
wherein the identifier of the first volume and the identifier of the adapter ~~which~~ are identified from ~~the identifiers described~~ included in an operand of a host command for the host ~~command~~ computer connected to at least one of the plurality of disk subsystems; and

issuing a command for forming a logical path between the adapters in an the extracted volume pair.

12. (currently amended) A method for transmitting a command ~~for to~~ a volume in a disk controller, comprising the steps of:

extracting from a volume pair list all volume pairs having at least one different identifier of an adapter ~~of a first volume,~~

wherein the first volume is as a copy source or a copy destination destination,

wherein the volume pair list registers one or more of the identifiers of the first volume and registers one or more of the identifiers of the adapter, and

wherein each of the volume pairs is of a remote copy target volume pair in the disk controller, from a list of all designated volume pairs for registering one and/or a plurality of the identifiers of the first volume and the adapter; and

issuing a command for forming a logical path between two adapters included in the extracted volume pair.

13. (currently amended) A command transmitting method of ~~s-volume a~~ volume in a disk controller, comprising the steps of:

transmitting first route information including an identifier of a first disk controller ~~for to~~ a second disk controller, wherein the second disk controller has ~~having~~ a logical path to the first disk controller;

transmitting, to the first disk controller, second route information additionally having an identifier of the second disk controller ~~in the first route information~~, by the second disk controller which receives the first route information; and

adding the first and second route information to a route list in the first disk controller by the first disk controller which receives the second route information.

14. (currently amended) A command control method of a volume in a disk subsystem, comprising the steps of:

obtaining an identifier of a first disk subsystem of a first volume, by referring to a volume pair list for registering an identifier of the first volume,

wherein the first volume is as a copy source or a copy destination of a volume pair, and

wherein the volume pair is as a remote copy target in the disk subsystem, by referring to a volume pair list for registering an identifier of the first volume;

obtaining an identifier of a second disk subsystem connected to a host computer, from a host path list for registering the identifier of the second disk subsystem;

issuing, to the second disk subsystem, a remote copy command of the first volume including the identifier of the first disk subsystem as input information; and

~~when if~~ the identifier of the first disk subsystem does not match an identifier of a third disk subsystem which receives the remote copy command, obtaining route information including the identifier of the first disk subsystem from a route list for registering route information ~~on~~ including an identifier of a fourth disk subsystem which can transmit the remote copy command from the third disk ~~subsystem~~ subsystem, and transmitting the remote copy command to the fourth disk subsystem indicated by the route information.

15. (currently amended) A command path control method of a disk controller, comprising the steps of:

receiving a remote copy command with a transmittal function;

holding, from a first disk controller, route information including indicating a route of an identifier of a second disk controller which can transmit the remote copy command;

~~inquiring determining~~ an identifier of the first disk controller ~~with and an~~ identifier of a third disk controller, wherein the third disk controller includes including a volume as a transmittal destination of the remote copy command;

obtaining, from the route information, ~~route information including the identifier of the third disk controller including that includes~~ the volume as the transmittal destination of the remote copy command; ~~and~~

transmitting the remote copy command to the second disk controller indicated by the route information; and

transmitting, via the second disk controller, the remote copy command to the third disk controller that includes the volume as the transmittal destination of the remote copy command.

16. (currently amended) A disk subsystem having a plurality of disk subsystems having volumes for storing data used for a host computer, for processing a command transmitted from the host computer and for remotely copying the volumes by connecting the disk subsystems, the disk subsystem comprising:

a memory for storing a volume pair list and a route list, the volume pair list for holding an identifier of a first volume as a copy source or a copy destination of remote copy and an identifier of a first disk subsystem of the first volume, and the

route list for holding route information including information for determining an identifier of the host computer, the identifier of the first disk subsystem, an identifier of a second disk subsystem for ~~relay as~~ relaying a transmitting route of the command to the first disk subsystem from the host computer, or an identifier of a third disk subsystem connected to the host computer among the second disk subsystems;

means for obtaining the identifier of the first disk subsystem including the first volume by referring to the volume pair list;

means for searching the route information including the first disk subsystem by referring to the route list and for obtaining the identifier of the third disk subsystem included in the route information; and

means for requesting the remote copy of the first volume in the first disk subsystem to the third disk subsystem relating to the obtained identifier.

17. (currently amended) The disk system according to Claim 16,
_____ wherein the host computer has the memory and a processing unit, and the memory further stores a program for ~~realizing obtaining of the identifiers~~ identifiers,
and
_____ wherein the host computer executes the program by the processing unit ~~so as to realize the obtaining means~~.

18. (currently amended) The disk system according to Claim 16,
_____ wherein the volume pair list is stored in the memory included in the host
computer, the route list is stored in at least the memory included in the first disk
subsystem, and

wherein the second disk subsystem ~~for relay~~ has means for receiving a
command for requesting the remote copy and for transmitting the received command
to the third disk subsystem.

19. (currently amended) A remote copy control method for remotely copying a
volume by connecting a plurality of disk subsystems having volumes for storing data
used by a host computer, the remote copy control method comprising the steps of:

loading, to a main memory, a volume pair list for registering an identifier of a
first volume as a copy source or a copy destination of remote copy and for
registering an identifier of a first disk subsystem of the first volume;

loading, to the main memory, a route list for holding route information
including information for determining an identifier of the host computer, the identifier
of the first disk subsystem, an identifier of a second disk subsystem ~~for relay as~~
relaying a transmitting route of a command to the first disk subsystem from the host
computer, and an identifier of a third disk subsystem connected to the host computer
~~among the second disk subsystems~~;

obtaining the identifier of the first disk subsystem including the first volume by
referring to the volume pair list;

searching route information including the first disk subsystem by referring to the route list and obtaining the identifier of the third disk subsystem included in the route information; and

issuing a command for remotely copying the first volume in the first disk subsystem to the third disk subsystem relating to the obtained identifier.

20. (currently amended) A remote copy command transmittal method for transmitting a command for remote copy of a volume by connecting a plurality of disk controllers having volumes for storing data processed by a host computer, the remote copy command transmittal method comprising the steps of:

preparing, in a memory, a volume pair list including an identifier of a first volume as a copy source or a copy destination of a volume pair ~~as a remote copy target in the disk controllers~~ and an identifier of a first disk controller including the first volume,

wherein the identifier of the first volume and the identifier of the first disk controller ~~which~~ are identified based on an identifier of a host command to the host computer, which is connected to at least one disk controller, and

wherein the volume pair is a remote copy target in the disk controllers;

extracting identifiers of the ~~different~~ plurality of disk controllers from the volume pair list and obtaining an identifier of a second disk controller for directly issuing a command from the host computer from among the extracted identifiers of the ~~different~~ plurality of disk controllers;

preparing, in the memory, a disk controller path list comprising a set of the identifiers of a pair of disk controllers,

wherein the set of the identifiers of a pair of disk controllers includes a disk controller pair having at least one of a first identifier and a second identifier of the disk controllers, and

wherein the disk controller pair ~~which is different from those of another pair,~~
~~serving as a volume pair included in the volume pair list;~~

obtaining a set of identifiers including the identifier of the second disk controller from the disk controller path list; and

preparing, in the memory, a route list including route information including the identifier of the host computer, the identifier of the second disk controller, and an identifier of a third disk controller different from the identifier of the second disk controller included in the set including the identifier of the second disk controller;

searching route information including the first disk controller by referring to the route list and obtaining an identifier of a fourth disk controller as the copy destination included in the route information; and

transmitting a remote copy command of the first volume in the first disk controller to the fourth disk controller relating to the obtained identifier.